frame. The first supporting frame and the second supporting frame have an independent relationship in respect to the vibration, so that there is little danger that, if a slight vibration remains in the first supporting frame due to the reaction force by driving the stage, this vibration becomes the vibration factor of the projection optical system. Accordingly, the positional shift of the pattern to be transferred or the image blur caused, due to the vibration of the projection optical system, can be effectively suppressed, and the exposure accuracy can be improved. And, at least one of the mask stage and the substrate stage can be increased in size and in acceleration and velocity, thereby also improving throughput.

IN THE CLAIMS

Please cancel Claims 1-27 without prejudice.

Please add new Claims 28-54 as follows:

28. (New) A stage unit comprising:

a sample stage that holds a sample;

a stage diving mechanism that drives the sample stage in at least one direction;

a first transmitting member to which at least one part of the stage driving mechanism is connected and a reaction force caused by driving the sample stage is transmitted; and

a first damping member that is arranged on the first transmitting member and damps a vibration of the first transmitting member.

29. (New) A stage unit according to Claim 28, wherein

the stage driving mechanism comprises a stator arranged on the first transmitting member and a mover that is driven together with the sample stage by an electro-magnetic interaction between the stator and the mover.

30. (New) A stage unit according to Claim 28, wherein

the first damping member is arranged to a position where a maximum strain of the first transmitting member is caused.

31. (New) A stage unit according to Claim 28, wherein

the first damping member is a piezo-electric element having electrodes at both ends and each of the electrodes is grounded via a resistor.

32. (New) A stage unit according to Claim 28, wherein

the first damping member is an electro-mechanical transducer that generates a mechanical strain by applying an electric energy, and

the stage unit further comprises a controller that controls the electro-mechanical transducer in accordance with a reaction force caused by driving the sample stage.

33. (New) A stage unit according to Claim 32, wherein

the controller controls the electro-mechanical transducer based on an instructing value of a drive force of the sample stage.

34. (New) A stage unit according to Claim 33, wherein

the controller feed-forward controls a voltage applied to the electro-mechanical transducer so that the electro-mechanical transducer generates a deflection deformation to cancel a deformation, which is caused in the first transmitting member by the reaction force, in the first transmitting member.

35. (New) A stage unit according to Claim 28, further comprising

a stage base that movably supports the sample stage and is supported by the first transmitting member.

36. (New) A stage unit according to Claim 28, wherein

the sample stage comprises:

a first stage that moves in the one direction; and

a second stage that holds the sample and can be relatively moved to the first stage.

37. (New) A stage unit according to Claim 36, further comprising:

a second transmitting member in which a reaction force caused by driving the second stage is transmitted via the first stage;

a linear actuator that drives the second transmitting member in the one direction;

a second damping member that is arranged on the second transmitting member and damps a vibration of the second transmitting member due to the reaction force caused by driving the second stage; and

a first controller that controls the stage driving mechanism and the linear actuator so that the first stage and the second transmitting member integrally move in the one direction.

38. (New) A stage unit according to Claim 37, wherein

the second damping member is arranged to a position where a maximum strain of the second transmitting member is caused.

39. (New) A stage unit according to Claim 37, wherein

the second damping member is an electro-mechanical transducer that generates a mechanical strain by applying an electric energy, and

the stage unit further comprises a second controller that controls the electro-mechanical transducer in accordance with the reaction force caused by driving the second stage.

40. (New) A stage unit according to Claim 39, wherein

the second controller controls the electro-mechanical transducer based on an instructing value of a drive force of the second stage.

41. (New) A stage unit according to Claim 40, wherein

the second controller feed-forward controls a voltage applied to the electro-mechanical transducer so that the electro-mechanical transducer generates a deflection deformation to cancel a deformation, which is caused in the second transmitting member by the reaction force, in the second transmitting member.

42. (New) An exposure apparatus comprising a mask stage unit including a mask stage that moves and holds a mask, as a sample, having a pattern, and a substrate stage unit including a substrate stage that moves and holds a substrate, as a sample, onto which the pattern is transferred, wherein

the stage unit according to Claim 28 is used for at least one of the mask stage unit and the substrate stage.

43. (New) An exposure apparatus according to Claim 42, further comprising

a projection optical system that is arranged between the mask and the substrate and projects the pattern onto the substrate.

44. (New) An exposure apparatus according to Claim 43, further comprising

a holder that is independent of the first transmitting member with respect to a vibration and holds the projection optical system.

45. (New) An exposure apparatus according to Claim 42, further comprising

a controller that synchronously moves the mask and the substrate, when the pattern is transferred onto the substrate.

46. (New) An exposure apparatus that forms a pattern on a substrate while a stage moves, comprising:

a stage base that movably supports the stage;

a counter stage that moves in a direction opposite to the stage in accordance with movement of the stage;

a first supporting frame that is arranged independently of the stage base and movably supports the counter stage; and

a damping member that is arranged on the first supporting frame and damps a vibration of the first supporting frame.

47. (New) An exposure apparatus according to Claim 46, wherein

the stage is a substrate stage that holds the substrate and moves.

48. (New) An exposure apparatus according to Claim 46, wherein

the stage is a mask stage that holds a mask on which the pattern is formed and moves.

49. (New) An exposure apparatus according to Claim 46, further comprising

a driver that drives the stage and at least one part of the driver is connected to the counter stage.

50. (New) An exposure apparatus according to Claim 49, wherein

the driver has a mover and a stator and the stator is arranged on the counter stage.

51. (New) An exposure apparatus according to Claim 46, further comprising

an original-position return mechanism that returns a position of the counter stage to an origin.

52. (New) An exposure apparatus according to Claim 46, further comprising:

a projection optical system that projects the pattern onto the substrate; and

a second supporting frame that is arranged independently of the first supporting frame with respect to a vibration and supports the projection optical system.

53. (New) A device manufacturing method including a lithography process, wherein

exposure is performed in the lithography process by using the exposure apparatus according to Claim 43.